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The use of quantitative risk assessment to assess lifetime welfare outcomes for breech strike and mulesing management options in Merino sheep

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Abstract

In Australia, flystrike can severely compromise sheep welfare. Traditionally, the surgical practice of mulesing was performed to alter wool distribution and breech conformation and thereby reduce flystrike risk. The aim of this study was to use published data to evaluate the effectiveness of an epidemiologically based risk assessment model in comparing welfare outcomes in sheep undergoing mulesing, mulesing with pain relief, plastic skin-fold clips, and no mulesing. We used four measures, based on cortisol, haptoglobin, bodyweight and behavioural change, across three farming regions in Australia. All data were normalised to a common scale, based on the range between the highest and lowest responses for each variable ('welfare impact'; I). Lifetime severity of welfare challenge (SWC) was estimated by summing annual SWCs (SWC = $I \times P$, where P = probability of that impact occurring). The severity of welfare challenge during the first year of life was higher for mulesed animals compared to unmulesed. However, over five years of life, the highest severity of welfare challenge was for unmulesed animals, and the lowest was for the plastic skin-fold clips. The model produced estimates of SWC that are in broad agreement with expert consensus that, although mulesing historically represented a welfare benefit for sheep under Australian conditions, the replacement of mulesing with less invasive procedures, and ultimately genetic selection combined with anti-fly treatments, will provide a sustainable welfare benefit. However, the primary objective of this work was to evaluate the use of the risk assessment framework; not to compare welfare outcomes from mulesing and its alternatives.